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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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24956	7590	06/05/2006	EXAMINER	
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SUITE 370			PAPER NUMBER	
ALEXANDRIA, VA 22314			2185	

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/766,823	Applicant(s) SATOYAMA ET AL.	
	Examiner Jae U. Yu	Art Unit 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/9/05 12/19/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The examiner acknowledges the applicant's submission of the amendment dated 3/16/2006. At this point claims 1, 3, 11, 13 and 14 are amended and claims 21 and 22 are added. Thus, claims 1-22 are pending in the instant application.

Response to Amendment

In view of the applicant's amendment, the original 112 rejections to claims 4, 11 and 14 are withdrawn.

Acknowledgement of Issues Raised by the Applicant

A. Arguments Concerning Prior Art Rejections

1st Point of Argument

In view of the applicant's arguments, the original 102 rejections to claims 1, 4-6, 8, 11, 14-16 and 18 are withdrawn.

2nd Point of Argument

In view of the applicant's arguments, the original 103 rejections to claims 2-3 and 12-13 are withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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1. Claims 1 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claim 1 recites the limitation "said disk drives" in line 16. There is insufficient antecedent basis for this limitation in the claim.
3. Claim 11 recites the limitation "the information" in paragraph 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 4, 5, 11, 14, 15, 21 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by McBrearty et al. (US 6,820,180).

2. **Independent claims 1 and 11** disclose, “a plurality of control units [**System 300 (Figure 3)**] implemented in each “Client” (**Figure 1**), **Column 5, Lines 46-51**] each connected with a respective disk unit [**“Disk” 326, Figure 3**]”.

“A replication creation unit [**Program executed by a computer system, Column 5, Lines 50-54**], each of the replication creation units being adapted to create a replication [**“Mirror”, Column 5, Lines 45-50**] of the data of the volume relating to the disk unit connected with the corresponding control unit”

“A plurality of volume pair information [**“Mirroring Map”, Column 6, Lines 35-37**], each of the volume pair information designating an original volume [**“A” in “PSS-1”, Figure 5**] and a replication volume [**“A” in “PSS-3”, Figure 5**]”

“A plurality of logical volumes [**“Data stored in partitions A & B” 532 & 534, Figure 5**] corresponding to at least one of said disk drives [**“PSS-4”, Figure 5**]”

“In the case where a replication is created in the volume relating to the disk unit [**“Local Backup”, Figure 5**] connected to the first control unit, the volume information of the original volume [**“PSS-1”, Figure 5**] and the volume information of the replication volume [**“PSS-3”, Figure 5**] are registered in the volume pair information, and a replication [**Data “A and B” replicated in “PSS-3”, Figure 5**] is created in the volume relating to the disk unit connected to the first control unit”

"In the case where a replication is created in the volume relating to the disk unit connected to a second control unit [**"Remote Backup", Figure 5**], the volume information of the original volume [**"PSS-1", Figure 5**], a virtual volume information of a virtual replication volume [**Partitions 522 and 534 in "PSS-3", Figure 5**] corresponding to at least one logical volume [**Partitions 532 and 534 in "PSS-4", Figure 5**] of the second control unit, and the information on the second control unit [**"PSS-4", Figure 5**] are registered in the volume pair information, and a request to create a replication [**Data "A and B" replicated in "PSS-4", Figure 5**] is transmitted to the second control unit"

3. **Claims 4 and 14** discloses, "the volume information of the replication volume of the first control unit registered in the volume pair information by the first control unit is virtual ID information [**Partitions 522 and 524, Figure 5**] for identifying, in the first control unit, the volume of the disk unit connected to the second control unit [**"PSS-3" is the first control unit's copy of "PSS-4" in the second control unit, Figure 5**]".

"The information on the second control unit registered in the volume pair information by the first control unit is ID information [**"PSS-4", Figure 5**] for identifying, in the second control unit, the second control unit [**"Remote Client" controlling "PSS-4", Figure 3, Figure 5**] and the replication volume [**"PSS-4", Figure 5**] of the disk unit connected to the second control unit"

4. **Claims 5 and 15** discloses, "the volume pair information includes an identifier assigned to the volume pair of the original volume [**"PSS-1", Figure 5**] and the replication volume [**"PSS-4", Figure 5**].

"Wherein one or a plurality of the identifiers [**"PSS-1", Figure 5**] are assigned to the one original volume"

5. **Claims 21 and 22** disclose, "the replication creation unit of the first control unit issues to the second control unit a request to write data [**Mirroring data "A and B" in "PSS-3", Figure 5**] corresponding to the virtual replication volume to the at least one logical volume [**"A and B" in partitions 532 and 534 (PSS-4), Figure 5**] of the second control unit corresponding to the virtual replication volume".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 2, 3, 12 and 13** are rejected under 35 U.S.C. 103 (a) as being obvious over McBrearty et al. (US 6,820,180) in view of Karlquist (US 4,785,415).

2. As per **claims 2 and 12**, McBrearty et al. discloses, “each of the control units includes a cache memory [**“Cache” 308, Figure 3**] for temporarily storing the data”.

McBrearty et al. do not disclose expressly, “copying the data of the original volume as a data for the replication volume in the cache memory of the first control unit, and transmits the copy data in the cache memory to the second control unit”.

Karlquist discloses a “FIFO buffer” (“Cache Memory”) that temporally holds data before data transmission in column 4, at lines 59-54.

McBrearty et al. and Karlquist are analogous art because they are from the same field of endeavor of data transfer.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by including a “FIFO buffer” that temporally holds data before data transmission in the “first control unit” and the “second control unit” as taught by Karlquist in column 4, at lines 59-64.

The motivation for doing so would have been to “smooth out variations in the rate at which data is output” as expressly taught by Karlquist in column 4, at lines 59-64.

Therefore, it would have been obvious to combine Karlquist with McBrearty et al. for the benefit of transmission rate control to obtain the invention as specified in claims 2 and 12.

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3. **Claims 3 and 13** disclose, “the second control unit stores the data received from the first control unit in the cache memory of the second control unit, after which the data is stored in the volume relating to the disk unit connected to the second control unit”.

Karlquist discloses a “FIFO buffer” (“Cache Memory”) that temporally holds data before data transmission in column 4, at lines 59-54. The “FIFO buffer” receives data from the “first control unit” after that, the data is transmitted to the “disk unit” for permanent storage.

4. **Claims 6 and 16** are rejected under 35 U.S.C. 103 (a) as being obvious over McBrearty et al. (US 6,820,180) in view of Malik et al. (US 2004/0085317).

5. As per **claims 6 and 16**, McBrearty et al. disclose the system and the method recited in claims 1 and 11.

“The replication creation unit registers information in the volume pair information based on a host command received from a host **[A host command from system containing “PSS-1”, Figure 5, McBrearty et al.]**”

McBrearty et al. do not disclose expressly, “the information input from a user input/output apparatus”.

Malik et al. disclose parameters that are defined based on “user input” in paragraph 22.

McBrearty et al. and Malik et al. are analogous art because they are from the same filed of the endeavor of data processing.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by allowing parameters to be adjusted based on user input as taught by Malik et al. in paragraph 22.

The motivation for doing to would have been to “further improve flexibility” as expressly taught by Malik et al. in paragraph 22.

Therefore, it would have been obvious to combine Malik et al. with McBrearty et al. for the benefit of flexible interface to obtain the invention as specified in claims 6 and 16.

6. Claims 7-10 and 17-20 are rejected under 35 U.S.C. 103 (a) as being obvious over McBrearty et al. (US 6,820,180) in view of Dandrea et al. (US 2002/0013864).

7. As per claims 7 and 17, McBrearty et al. disclose the system and the method recited in claims 1 and 11.

Dandrea et al. disclose, “a plurality of normal read/write processing queues [**“Steady-state Queue” 221, Figure 2**] corresponding to the plurality of the control

units, respectively, each of the queues being adapted to form a schedule **[Given highest priority, Paragraph 30]** for a normal read/write request, and a plurality of low job priority queues **[“Other Request Queue” 223, Figure 2]** corresponding to the plurality of the control units, respectively, each of the low job priority queues being adapted to form a schedule for a request low in job priority **[Given lowest priority, Paragraph 30]** than the normal read/write request; wherein in the case where a request for creating a reapplication is processed equivalently to the normal read/write request, the control unit places a request for creating a replication in the normal read/write processing queue **[“Steady-state Queue” 221, Figure 2]**, while in the case where a request for creating a replication is processed in the order of priority lower than the normal read/write request, the control unit places the reapplication creation request in the low job priority queue **[“Other Request Queue” 223, Figure 2]**”.

McBrearty et al. and Dandrea et al. are analogous art because they are from the same field of endeavor of data access control.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by including queues based on corresponding priority as taught by Dandrea in paragraph 30.

The motivation for doing so would have been to “provide opportunities to alter the disk access requests and their execution order prior to sending the requests to the disk queue” as expressly taught by Dandrea et al. in paragraph 8.

Therefore, it would have been obvious to combine Dandrea et al. with McBrearty et al. for the benefit of rearranging data execution order to obtain the invention as specified in claims 7 and 17.

8. As per claims 8 and 18, McBrearty et al. disclose the system and the method recited in claims 1 and 11.

Dandrea et al. disclose, "each of the job priority set units [**"Queue Selector", Figure 2]** determining the job priority information as to whether a request for creating a replication is to be processed equivalently to the normal read/write request [**Placed in "Steady-state Queue", Figure 2]**, the job priority set unit notifying the job priority order information to the other control units [**"Disk 1", 120, Figure 2]**".

"A control unit that has received the notification of the job priority information from other control units forms a schedule [**Queue 125, Figure 2]** for sequentially processing the requests based on the job priority information [**Input to the queue 125 arranged based on the priority, Figure 2]** thus received"

McBrearty et al. and Dandrea et al. are analogous art because they are from the same field of endeavor of data access control.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by including queues based on corresponding priority as taught by Dandrea in paragraph 30.

The motivation for doing so would have been to “provide opportunities to alter the disk access requests and their execution order prior to sending the requests to the disk queue” as expressly taught by Dandrea et al. in paragraph 8.

Therefore, it would have been obvious to combine Dandrea et al. with McBrearty et al. for the benefit of rearranging data execution order to obtain the invention as specified in claims 8 and 18.

9. As per claims 9 and 19, McBrearty et al. disclose the system and the method recited in claims 1 and 11.

“The information indicating a replication creating process [**Volume information of “PSS-3”, Figure 5, McBrearty et al.**] is added to the control instruction for transmitting the replication creation request [**“PSS-4” replicates “PSS-3”, Figure 5, McBrearty et al.**].”

McBrearty et al. do not disclose expressly, “the second control unit that has received the control instruction determines whether the request is to be processed in priority, based on the information indicating a replication creation process, and forms a schedule for sequentially processing the requests”.

Dandrea et al. disclose the “disk” (“the second control unit”) that forms a “Queue 125” (“schedule”) based on the data from the priority queues 221-223 in Figure 2. If only one of the three priority queues contains data, then the request is determined not to be processed in priority.

McBrearty et al. and Dandrea et al. are analogous art because they are from the same field of endeavor of data access control.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by including queues based on corresponding priority as taught by Dandrea in paragraph 30.

The motivation for doing so would have been to “provide opportunities to alter the disk access requests and their execution order prior to sending the requests to the disk queue” as expressly taught by Dandrea et al. in paragraph 8.

Therefore, it would have been obvious to combine Dandrea et al. with McBrearty et al. for the benefit of rearranging data execution order to obtain the invention as specified in claims 9 and 19.

10. As per **claims 10 and 20**, McBrearty et al. disclose the system and the method recited in claims 1 and 11.

McBrearty et al. do not disclose expressly, “the information indicating the priority order is added to the replication creation request, and wherein the second control unit determines as to whether a replication creation request is processed in priority based on the received information indicating the priority, and forms a schedule for sequentially processing the replication creation requests”.

Dandrea et al. disclose the “disk” (“the second control unit”) that forms a “Queue 125” (“schedule”) based on the priority data from the priority queues 221-223 in Figure 2.

McBrearty et al. and Dandrea et al. are analogous art because they are from the same field of endeavor of data access control.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify McBrearty et al. by including queues based on corresponding priority as taught by Dandrea in paragraph 30.

The motivation for doing so would have been to “provide opportunities to alter the disk access requests and their execution order prior to sending the requests to the disk queue” as expressly taught by Dandrea et al. in paragraph 8.

Therefore, it would have been obvious to combine Dandrea et al. with McBrearty et al. for the benefit of rearranging data execution order to obtain the invention as specified in claims 10 and 20.

Citation of Relevant Art

The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure.

The following reference teaches buffering data in communication systems.

U.S. PATENT NUMBER

FIGURES

07/187052

1-8

Conclusion

A. Claims Rejected in the Application

Per the instant office action, claims 1-22 have received a second action on the merits and are subject of a second action non-final.

B. Direction of All Future Remarks

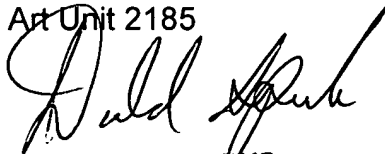
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jae U. Yu whose telephone number is 571-272-1133.

The examiner can normally be reached on M-F 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

May 26, 2006

Jae Un Yu
Art Unit 2185

DONALD SPARKS
SUPERVISORY PATENT EXAMINER